REPORT OF FOUR CASES OF NEPHRECTOMY FOR PYO- AND PYELO-NEPHRITIS.[1]

By SAMUEL B. WOODWARD, M.D.,

OF WORCESTER, MASS.,

SURGEON TO THE CITY AND MEMORIAL HOSPITALS.

PRIOR to 1893 my experience with kidney surgery was limited to perinephritic suppuration, although I now strongly suspect that several of my earlier cases, as well as some diagnosed as old pelvic and abdominal abscesses, originated in the kidney substance itself.

Although the symptoms of pus in the kidney, from whatever cause, may be obscure, even when suppuration is, from the general condition, evidently somewhere going on, systematic physical exploration will leave undetected comparatively few kidneys which ought to be brought to the attention of the operating surgeon.

Even moderate enlargement of the kidney can, in the majority of cases, be determined.

A movable kidney tumor usually presents signs which, added to the history and the examination of the urine, prevent the diagnosis from being difficult.

A dilated gall-bladder has, however, been mistaken for this organ, as have also tumors of the pancreas and spleen.

That a limited patch of malignant disease, on the greater curvature of a dilated stomach, was not a wandering kidney, was in one case revealed to me only by an exploratory laparotomy, and I lately cut down on to a displaced and movable liver, under the impression that it was a tumor connected with the right kidney.

[1] Read before the Worcester Medical Association, February 27, 1895.

Such errors of commission are, however, uncommon, and serious doubt as to the location of tumors is rarely possible.

By ureteral catheterization we can, in the female, determine in which kidney pyelitis is present in many cases, or can settle the equally important point, whether both kidneys are unfortunately seriously affected.

Kidney suppuration diagnosed and all methods failing to determine the affected organ, we are reduced to exploratory incision, either median or, better, to one or other side of the abdomen, as advocated by those who prefer the abdominal route, or in one or the other flank, following the extra-peritoneal operators, taking thus one chance in two of finding the affected kidney, and, failing in the first incision, turning to the other side for the diseased organ.

My cases have all been suppurative; the lumbar route has in all been taken. In three of them the kidney was removed some weeks after a preliminary nephrotomy. In none were calculi found.

CASE I.—*Chronic Pyelo-Nephritis, with Acute Exacerbation; Nephrotomy, followed in Eight Weeks by Nephrectomy; Recovery.*—N. D., aged twenty-five years, married, was sent to the City Hospital January 18, 1893, with a diagnosis of peritonitis. She stated that, six years before, a physician (Dr. Halloran) told her that she had kidney disease. The Memorial Hospital records made no mention of such disease one and a half years later, at which time she was under treatment there for the sequelæ of a miscarriage.

Two years before entrance, having again miscarried, she had severe pain in the left loin and lumbar region similar to that accompanying the present attack, but recovered without medical attendance. A year later she again miscarried.

Eight days before coming to the hospital, there was a severe sudden attack of colicky pain on the left side, accompanied and followed by nausea and vomiting. This was controlled by opiates, and grew gradually less paroxysmal and more constant, extending also further towards the centre of the abdomen. There were chilly sensations, but no decided chill. The urine was muddy with a heavy sediment from the beginning, and may have been so for a long time previous to this attack. For five days there was no movement of the

bowels. When seen the expression was anxious, the skin hot and dry, the temperature 103° F., and the pulse 120. A tender swelling occupied the left loin from costal border to iliac crest. This was flat on percussion, and as large as a child's head at birth. The muddy urine had a most foul odor, contained ½ per cent. of albumen, and the sediment occupied one-third of its bulk on settling. This sediment consisted, as far as could be determined, solely of pus-corpuscles.

There could be but one diagnosis. Dr. R. W. Greene, to whose wards she was admitted, at once recognized the surgical importance of the case, and she was the next day, after consultation, transferred to my service.

January 20, by longitudinal lumbar incision, the kidney was reached and freely incised. Some eight ounces of foul pus escaped. The organ was practically converted into a suppurating cyst, though kidney tissue could be recognized in its wall. No calculi were present, nor was the ureter apparently blocked. After washing out, the cavity was packed with iodoform gauze, with a central drainage-tube. Shock was very severe, the pulse being over 150, and numerous stimulant hypodermic injections were given during and after the operation. Gauze was removed on the third day, and the wound daily and freely irrigated, until in six weeks the patient, who was helping in the ward work, eating and feeling well, was, although with still a small discharging sinus, at her own request allowed to go home.

March 19 she was readmitted, drunk, with a sprained ankle, and a foul discharge from the evidently neglected sinus. There was, at this time, pus in the urine.

Four days later the old incision was reopened, and the kidney dissected out and removed. The vessels and the ureter were at first separately tied with silk, and then, by a third ligature, resecured together. Hæmorrhage slight. Gauze packing as before. Shock was severe, and for five days the outlook was dubious. Nausea and vomiting were almost constant, the abdomen became much distended, no nourishment could be taken, and even enemata were rejected.

Some very dry champagne was at last retained, and the patient gradually rallied.

Convalescence was slow, there was much burrowing of pus, and it was not until June 5 that she finally left the hospital, and then against advice, as a small sinus was still discharging.

Soon thereafter she was confined in a public institution where, for a year at least, she had healthy surroundings.

The wound is now, two years after operation, entirely closed and her general health is perfect.

CASE II.—*Pyelo-Nephritis with Perinephritic Abscess; Nephrectomy Six Months after a Late Nephrotomy; Death; Autopsy.*—W. S., aged thirty-two, married, entered the City Hospital December 15, 1891. Nine days before he noticed a bunch in the left side, having previously, and for some time, had pain in this region. A sharply defined, doubtfully fluctuating tumor extended from the ribs to the iliac crest. This was painful, but not particularly tender, and seemed to be retroperitoneal. The specific gravity of the urine was 1024, and the reaction acid. No albumen was present. The patient received an injury to the left testicle ten years before, followed by suppuration for a long time and at intervals. A soft mass occupied the site of this organ, and there were indurated scars in the left side of the scrotum. The general condition was poor.

December 17 Dr. H. Gage, then on duty, by a lumbar incision evacuated five pints of foul pus, and packed and drained the enormous abscess cavity.

January 11, 1892, when I first saw the patient, the wound was still discharging pus, the left thigh was swollen, œdematous, and tender to pressure, particularly on the inner side, and there was phlebitis of the deep veins of the leg.

February 6 the patient was, and had been for some time, markedly septic; the temperature was ranging from 102° to 104° F. at night, and pus was pouring from a small opening at the site of the December incision. Under ether I at this time made a new lumbar incision, opened a large partially filled abscess cavity, and found at the bottom what was apparently the left kidney hard and swollen. A somewhat restricted incision into this showed no kidney structure, but a tissue fibrous and grating under the knife.

No fluctuation being felt and no communication with the abscess detected, the perinephritic cavity was packed and the operation terminated. (It is clear to me now that my incision was simply into the thickened capsule, not deep enough to reach the seat of trouble.) No improvement followed, and pus soon began to burrow in various directions.

March 12 the sinuses were slit up, and the abscess cavity curetted out under ether.

From April 1 to June 7 the patient was under the care of Dr. O. H. Everett, who succeeded me. No further operations were done, and he was at the latter date discharged unrelieved.

October 3 he was readmitted, weaker, with much pain in side and leg, two sinuses in the back, both discharging freely, and a septic diarrhœa; the urine with a specific gravity of 1022, a trace of albumen, a slight amount of pus, and a few blood-corpuscles, but no casts.

October 15, the diarrhœa being somewhat better, Dr. Gage re-opened the abscess cavity, now extending high up under the ribs and far down towards the pelvis, and at the bottom exposed the lower end of the soft and boggy kidney, which he freely opened, giving vent to pus and broken-down tissue.

Improvement was but temporary, the patient continuing septic, with high temperature, diarrhœa, occasional nausea, and persistent and excessive discharge.

December 20 a large abscess, deep down under the muscles of the front of the thigh, was opened.

January 1, 1893, when I again came into the wards, one could irrigate from the openings in the back through that in the front of the thigh; the left thigh was flexed to a right angle; there was pain, diarrhœa, and a copious discharge, soaking everything twice a day. For three months nothing was done except intermittent extension to the leg, and death was apparently soon to terminate the scene. Finally, as he seemed a little stronger, and as he demanded another operation, although told the chances were ten to one against him, I, on March 30, fifteen months after he first came under hospital observation, removed the kidney. The urine now contained 1/8 per cent. albumen, pus free and in clumps, renal epithelium, and abundant hyaline and fine and coarse granular casts.

The kidney tissue was very friable, and hæmorrhage excessive. It was impossible to thoroughly free the kidney behind, find vessels, make a narrow or, indeed, any proper pedicle, or pass a ligature, and with clamps and tight packing the hæmorrhage was controlled, and the operation hurriedly finished. The patient never rallied, and died in ninety minutes. The operation lasted nearly one hour.

At the autopsy, held that afternoon, it was found that the psoas muscle on the left side was infiltrated with round-cell inflammatory material, which new formation extended up to and surrounded the renal vessels with the thick tough mass, which had prevented the

complete removal of the kidney and the securing of its vessels. The other kidney was, as was suspected, amyloid, and the one removed a mere mass of detritus and abscess wall, with very little kidney tissue to be seen.

CASE III.—*Chronic* (?) *Pyonephritis with Acute Exacerbation; Nephrotomy, followed in Six Weeks by Nephrectomy; Recovery.*—June 18, 1893, I saw at her home, in consultation with Dr. R. W. Greene, Mrs. L. B., aged twenty-eight years.

Since the birth of a child four years before, her health had been unsatisfactory. Her previous medical attendant, now deceased, had thought her symptoms dependent on a laceration of the cervix uteri, and six weeks before I saw her trachelorrhaphy had been performed by an out-of-town surgeon.

Since this operation she had been confined to her bed, had been steadily growing worse, and was when I saw her markedly septic. Her temperature averaged about 102° F.; she had daily chills and profuse night-sweats. All stitches had been removed from the cervix. Nothing could be detected per vaginam to account for her condition. The urine had been once examined by Dr. Greene, who had been but a short time in attendance, with negative results.

Tenderness and increased resistance were noted in the right lumbar region, but, as the patient was desirous of entering my service at the Memorial Hospital, the diagnosis was left in abeyance until further urinary analysis could be obtained.

The urine was at the hospital found to contain ⅛ per cent. of albumen and an abundant sediment, consisting principally of pus with a small amount of blood and some bladder epithelium. The reaction was acid. It was now learned that for a long time there had been intermittent pain in the right side running down from the lumbar region into the right hypogastrium, and that coincident with an attack the patient had noticed that the urine was clear, while at other times it was thick and muddy. Clear urine free from pus was also obtained once after she entered the hospital, thus substantiating Dr. Greene's analysis.

In the right lumbar region could be made out a moderately-tender tumor, occupying the site of the kidney, and reaching well down to the iliac crest.

This was manifestly the source of the pus in the urine, and could be nothing but the enlarged or dilated kidney.

Nephrotomy was decided on as a preliminary and possibly final

operation (her condition seemed to render nephrectomy at this time a desperate measure), and June 27 by longitudinal lumbar incision the kidney was reached, and a large quantity of pus evacuated. The walls of several small abscesses with which the kidney was honey-combed were broken down with the finger, and the whole packed with gauze and drained with rubber tubing.

Immediate improvement resulted: the urine became clearer, though it still at times contained pus; the temperature fell; there were no more chills; night-sweats ceased, and the appetite increased. Early in August, however, there was renewed complaint of pain; diarrhœa appeared; there were occasional chilly sensations; the temperature began to rise; and there was more pus in the urine, although drainage was still free.

August 18 the kidney was removed by reopening the old incision. The ureter and vessels were tied separately. Handkerchief gauze packing and poultice to the left kidney. Hæmorrhage insignificant. Time of operation thirty minutes.

Shock was profound and pain severe. The pulse remained at 120–140 for several days, and vomiting persisted until champagne was given, when it at length ceased. Convalescence was prolonged, and a sinus remained for nearly five months, closing only after both silk ligatures had been discharged.

Five days after the operation urine appeared in the dressing, and for several weeks escaped in large quantities. This, of course, regurgitated through the dilated (?) ureter, from which the ligature had evidently slipped. Nine months after the operation a superficial abscess was evacuated, after which the wound rapidly healed, and is now perfectly sound.

At present, eighteen months after operation, the patient is in good health, better, she says, than for many years.

Dr. Lois Nelson, the hospital pathologist, reports that the specimen consists of the right kidney without capsule. Weight three ounces; length four and a half inches; width two inches; thickness one and a quarter inches. Thickness of cortex one-eighth of an inch; of medulla one and one-sixteenth inches. External surface lobulated from contraction of interpyramidal tissue. Raised portions dark red, depressed portions yellowish.

Longitudinal Section.—Cortex varies much in appearance. Some parts are white and opaque; others show plainly medullary rays and labyrinths. No healthy medullary pyramid remains, an abscess hav-

ing developed in each. Some of these pus cavities are lined by thick white membrane. One has a diameter of seven-eighths of an inch; another of one and one-eighth inches. The remaining eight are of various sizes. One opens into pelvis of kidney. The kidney is so friable that the pelvis is badly disintegrated.

CASE IV.—*Acute Pyonephritis with Marked Symptoms; Primary Nephrectomy; Recovery.*—Mrs. H. F., aged twenty-two, a mulatto, was admitted to my service at the Memorial Hospital, April 8, 1894. Since the birth of a child, six months before, she had been in poor health, but beyond general complaints of "misery" little definite could be learned of her symptoms.

She was from February 27 until March 22 at the hospital under the care of another physician.

From the records it appears that at entrance the urine was examined for albumen and sugar and that neither was present. Nothing abnormal was detected in the pelvis. The respiratory murmur was fainter over the right lung than over the left. Treatment was directed to pain in the left ankle, of which alone she complained, and to the arrest of a troublesome leucorrhœa.

There was an irregular nightly rise of temperature to 101° or 102° F., and this existed at the time of her discharge, although she was then up and about. For this temperature no cause was found.

At the time of her return, two weeks later, when I first saw her, the pulse was 115, the temperature 103.6° F. Albumen was present in the urine and numerous pus-corpuscles were found in the sediment.

The patient had for three days been constipated, for a week had suffered from paroxysmal pain in the right inguinal region, and for five days had been continuously vomiting. Nothing was found in the pelvis, but there was increased resistance and tenderness to pressure in the right lumbar region, and a hard, moderately movable body, assumed to be the enlarged kidney, was dubiously apparent.

Vomiting was uncontrollable, the patient's condition was becoming desperate, and an exploratory operation at least seemed indicated.

April 12, after securing free catharsis, the usual straight lumbar incision was made, the tumor reached without difficulty, and found to be the enlarged kidney.

In separating it from the perinephritic fat, the finger penetrated its softened lower end, opening also a small abscess. No large abscess cavity being found, it seemed best to enucleate immediately, and the kidney was accordingly peeled from its capsule and removed.

The ureter was tied and stitched to the lower angle of the wound, and a separate ligature thrown around the vessels. Through incautious traction on the delivered kidney these latter were stretched so taut that they slipped through the ligature when the tension was removed, but were, fortunately, secured by the thumb and finger before much blood was lost. Handkerchief gauze packing and poultice to the remaining kidney. Time of operation thirty-five minutes.

Shock was so marked, in spite of abundant stimulation, that for two hours the patient was left on the table with pelvis and legs elevated. For seventy-two hours vomiting was persistent and everything was rejected. Finally champagne was retained, and from this on convalescence was uneventful. The wound was closed in four weeks and the patient discharged well May 27.

Dr. Nelson reports that the kidney removed was five and a half inches long, two and a half inches wide, and one and a half inches thick, with a weight of eight ounces. The kidney substance was very friable; the entire surface congested. On the surface were fourteen large and numerous small raised areas, the periphery of each being deeply congested and the centre whitish and necrotic. From some of these, when opened, pus exuded. At the lower end was an opening made by the surgeon's fingers. The cortex was from three-eighths to three-fourths of an inch in thickness. The difference between the medullary rays and the pyramids of Ferrein was very marked, the medullary rays looking fairly healthy, while the pyramids of Ferrein were deeply congested and had necrotic areas varying in size. Many of the pyramids of Malpighi were hyperæmic, while others seemed to be normal. The pelvis was congested at the lower and normal at the upper end.

Under the microscope very little kidney tissue was found. Most of the glomeruli had shrunken, the epithelium of Bowman's capsule was granular and swollen, as was the epithelium of the convoluted tubes. Pus was seen in many tubules. There were numerous hæmorrhages, and small abscesses throughout the section. In many places the kidney structure was replaced by small round cells of inflammation and by abscesses. No tubercles were found.

From October to December of the last year Mrs. F. was in the hospital with some obscure septic trouble. She had remained well for five months, when she was suddenly seized with pain in the right side, chills, and feyer. There was neither pain nor tenderness at the site of operation. Numerous urinary examinations were made with

negative results. There was no enlargement of the spleen. Some dulness over the lower lobe of the right lung, a few moist râles, and a friction rub were all the physical signs obtained. She failed steadily for four weeks, having persistent vomiting and a temperature frequently reaching 105° F., and then began unaccountably to improve, and was finally allowed to go home. No definite diagnosis was made by the physician in whose care she was. At home she steadily improved, and is now in fairly good health.

The complete and apparently sudden collapse of the kidney in the last case suggests marked interference with its blood-supply.

In the other three cases there was, at any rate, a possible source of infection from below, and, indeed, No. 4 may date from infection during or after labor.

No. 1 had miscarriage after miscarriage, with continued possibility of infection through the bladder. She was also an alcoholic.

No. 2 had an injury resulting in loss of a testicle and prolonged suppuration.

No. 3 became immediately worse after a surgical operation on the genital tract. She was catheterized, had taken ether, and had been ailing since the birth of a child.

Nephrectomy being decided on, shall we remove the kidney by abdominal incision, or attack it from behind and extraperitoneally?

The first abdominal operations were so terribly fatal that at one time this route was almost abandoned, but lately several surgeons, and notably Maurice Richardson, of Boston, have readvocated its use, not only with selected cases and large tumors, but as a universal rule.

In a paper read before the Surgical Section of the Suffolk District Medical Society, January 4, 1892, Dr. Richardson, while acknowledging that his experience was small (four cases), stated that he should never seriously think of removing a kidney through the loin, as he considered it a very difficult and dangerous operation. He thought that the danger of hæmorrhage alone exceeded the immediate and remote dangers of the whole operation by the

anterior route, it being impossible to deliver the kidney satisfactorily without the greatest danger of tearing the renal vein and again very difficult to tie the pedicle. He would therefore not seriously consider the lumbar operation upon the kidney where any question of its removal was involved. For the operation of nephrotomy, however, he acknowledged the lumbar incision to be the better.

Unless in pyelo-nephritis and kidney abscess we are ready to advocate immediate enucleation without preliminary nephrotomy, it is difficult to see how this ruling can be accepted, and that there are cases where, by a preliminary incision, the general condition is often so greatly, though perhaps temporarily, improved that the probability of successful kidney removal some weeks later is much greater, can scarcely be doubted. Again, pyonephritis may be diagnosed, the kidney consequently incised, and found so riddled with abscesses that it is impossible, without cutting it in pieces, to open them all. Nephrotomy then becomes almost, if not quite, as formidable an operation as nephrectomy, without its compensation, removal of the offending body. Nothing is gained and much lost by delay, and immediate nephrectomy is indicated. Shall an abdominal incision be made with the attendant risk of contaminating the peritoneum, to say nothing of the addition to shock already sufficiently great?

Can the most able diagnosticians invariably differentiate perinephritic suppuration from kidney enlargement, and would any one wish to drain a perinephritic abscess through the peritoneal cavity if it could be avoided? Do we not also find cases in which pus is present both inside and outside the kidney, in which it is even doubtful where it primarily appeared, so that with all signs of an infected kidney we may suddenly open a pool of pus before reaching it?

By straight lumbar incision at the outer edge of the quadratus the kidney is reached by practically blunt dissection in a surprisingly short time, and by curved cuts at one or both ends or by a cross-cut towards the front sufficient room can be obtained without opening the peritoneum, for these cases at least.

James Israel goes even farther, for he advocates[1] the re-

[1] Archiv für klinische Chirurgie, September, 1894.

moval of all kidney tumors, even the most voluminous, by lumbar incision.

After the kidney has been tied off and removed, he, through his incision (made sufficiently large by cuts, transverse or oblique, curved or angular), with large-bladed, long, and brightly polished retractors, brings all parts of the wound into view, so that hæmorrhage can be efficiently stopped and any accidental peritoneal rents repaired.

To early operation, due to more precision in diagnosis and more particularly to the exclusive use of the extraperitoneal method, he attributes his extremely favorable results; results far better than those hitherto reported by any other extensive operator.

With eighty-one capital operations there were but eleven deaths, a percentage of 13.7; and with thirty-seven nephrectomies but six fatal results.

All cases of nephrectomy for renal tuberculosis, hydronephrosis, and renal syphilis recovered.

He lost two patients after extirpation of malignant growths (16⅔ per cent. of those operated on), and four after nephrectomy for pyo- and pyelo-nephritis (40 per cent.); a higher percentage than that given in Newman's table, where the death-rate was 27.3 per cent. in forty cases where no calculus was present and 36.3 per cent. in forty-four cases where this complication existed. The mortality after abdominal operation in these cases was, however, in Newman's 234 collected operations 41 and 60 per cent. respectively.

From four cases one should be cautious in drawing conclusions. Fortune or luck has favored me, and I am therefore not yet ready to attack every kidney from the abdomen. From what abdominal operations I have seen (three cases) I am not impressed with the fact that the pedicle is under any better control in this operation than in the lumbar, provided the incision is, in the latter case, made of sufficient extent, and, as one has always the way open to do a combined operation if the lumbar route is a failure, my future operations will be extraperitoneal until I see more light.

The operation (nephrectomy) is a formidable one at the best, and I am prepared in advance for the extreme shock which has with me thus far attended each and every operation.

Prolonged etherization has not been responsible, as in no case but the second (fatal) was more than forty-five minutes consumed, and in Nos. 3 and 4 but thirty and thirty-five minutes respectively.

In both these latter cases the kidney was removed without the capsule, as it was easier thus to peel it out, the capsule being thickened and adherent on every side. This materially shortened the operation without apparently complicating the result.

In future I shall invariably sew the stump of the ureter into the wound after ligating it, and shall limit the amount of traction upon the delivered kidney as much as possible while securing the pedicle, to avoid the misadventures reported in Cases III and IV.

It is to be borne in mind that even true surgical kidney is not always, primarily at least, bilateral (Weir found twelve cases out of seventy affecting one kidney only), and that early diagnosis and operation may save the unaffected kidney and thus a life; that abscess originating in one kidney may, if uninterfered with, through the bladder easily set up ureteritis and pyelitis of the opposite side, with but one possible termination; and that (the patient's condition warranting it) it is justifiable in acute septic invasion of the kidneys to make in one or both sides an exploratory incision, in the hope not only of relieving acute interstitial invasion but also of, perhaps, encountering a larger and well-defined focus of pus, and that even under such circumstances nephrectomy has been successfully performed.[1]

[1] ANNALS OF SURGERY, 1894, Vol. XX, p. 609.